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Student Opinions About Anatomy Education From Past to Future

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Research article

Abstract; The aim of this study is to analyze the effect of student views on the situations in the history of anatomy education that should be transferred to the future education and the structures that should be supported. 155 students participated in the study. The questions asked were created with a 5-point Likert test, and the students answered the questions via mail. Answers were analyzed on the system and then statistically analyzed. According to the statistics of the chi-square test of first and second-grade answers, there is a significant difference only in the first ($p=0.010$) and eleventh ($p=0.006$) questions ($p<0.05$). Supporting the study with student views has been very beneficial in terms of how to proceed in education. Analysis of student views can bring an effective and contemporary structuring to anatomy education, which is the main course of medical education.

INTRODUCTION

The indispensable element of anatomy education since history has been cadavers [1]. For many years, the place and importance of cadavers and dissection have always been discussed [2, 3]. In recent years, especially in our country, cadaveric anatomy education actually requires an enormous infrastructure. Preservation (coolant-tank-solution), acquisition (high-cost purchase when the donation is not available), and dissection of cadavers require both laboratory and qualified instructor infrastructure [4, 5]. In order to have vast dissection knowledge, dissection in a large number of cadavers and being skilled like a surgeon are two important factors. In addition to these, the necessity to overcome cadaver anxiety and to have a three-dimensional depth perception can be added to these elements [6, 7].

Surgical cadaver courses held in recent years have increased the importance of both anatomy instructors and cadaver education [8, 9]. Another significant effect of this is the development of cadaver embalming solutions used in anatomy laboratories. Fresh-looking cadavers and cadaveric embalming solutions, which are especially desired in the courses, have also paved the way for the need for renewal and development [10].

In recent years, different tools have started to take place in anatomy education [11]. One of them is three-dimensional models and software. The development of technology has enabled the transition to the digital world in the field of anatomy [12, 13]. In particular, digital three-dimensional atlases and three-dimensional cadaver software are of interest to students [14, 15]. In addition, the digital system has become almost indispensable for clinical and surgical branches within radiological anatomy and laparoscopic anatomy. While this is the case, the integration of cadavers and three-dimensional digital systems has become necessary for anatomy education [16, 17].

In this study, students' opinions were taken to guide education about the present and future of anatomy education. The student views obtained in the study can guide and benefit instructors in preparing an ideal and effective training model. The aim of the study is to present the idea of an ideal integrated education model to the literature by benefiting from student views.

MATERIALS and METHODS

Ethical approval

The study was approved by the ethics committee of Medicine Faculty of Kafkas University (Approval number: 2019/12). The study was performed following the aid of the ethical standards down in the 1964 Declaration of Helsinki and its later amendments.

Study design

The study was carried out on the first and second-year medical students of Medicine Faculty of Kafkas University in the 2019– 2020 academic year. The data collection forms used in the study were prepared on the web and sent to the students by e-mail. One hundred fifty-five students (75 from the first class, 80 from the second class) answered the questions in the data collection form. Data collection questions were prepared with a five-point Likert scale (totally agree, agree, undecided, disagree, totally disagree) [18]. The answers given by the students were automatically analyzed through the web system and the results were obtained through the software. The answer options given were calculated automatically on the system with the calculation of frequency and percentage. The answers are given by the first year and second-year students to the questions were statistically compared with the chi-square test [19].

RESULTS

The first and second years were compared according to the answers given by the students. Statistical analysis was carried out using SPSS 22.0 version software program for Windows. Descriptive statistics for categorical variables are expressed as frequency and percentage values. A Chi-square test was used in the analysis of categorical data. The results were evaluated at a 95% confidence interval, and a p-value of <0.05 was considered significant. First-year students agreed with the first question opinion more than the second year students (62.7%, 38.8%). In the second grade, there is a high rate of indecision (26.3%). While first-year students marked "I definitely agree" with the second question opinion (44%), second-year students marked "I agree" with a higher rate (53.7%). In the third question, the answers of both the first and the second year students were quite divided. In fact, both classes marked the answer "I do not agree" at a high rate (25.3%, 43.8%). But the

proportions in other options are close to each other. The answer to the fourth question is quite different between first year and second year students. First year students give the answer "I absolutely do not agree with the question" at a high rate (34.7%), while second year students give a high rate of "disagree" (38.7%) and indecisive attitude is also high (27.5%). While the first graders gave the answer "strongly disagree" (5th -6th questions 33.3%) (to the opinions of 5th and 6th questions, the second graders marked the "I do not agree" (5th question, 36.3%; 6th question, 31.3%) option a little more softening. The second graders marked the answer, "I do not agree" with the opinion of the 7th question at a higher rate than the first graders (second class 45%, first-class 32%). While the first graders gave a high rate of "disagree" (28%) to the opinion of the 8th question, the second graders interestingly showed a high rate of indecision (40%). To the opinion of the 9th question, the first graders answered 'I strongly agree' at a high rate (56%), while the second graders answered 'I agree' at a high rate (40%). The number of indecisive and disagreeing with the opinion of the 10th question in the first year is both the same and high (30.7%). The second grade, on the other hand, answered the opinion of the 10th question with a high rate of disagree with the first grade (31.3%). While the first grade answered the answer "strongly do not agree with the opinion of the 11th question" (30.7%), the second class answered "I do not agree" with a high rate (33.8%). Both the first and second-year students highly disagree with the opinion of the 12th question. All the answer rates given by the first and second graders regarding the questions are given in tables 1 and 2. According to the statistics of the chi-square test of first and second-grade answers, there is a significant difference only in the first (p=0.010) and eleventh (p=0.006) questions (p<0.05). Other 'p' values are given in table 3.

DISCUSSION

The basis of anatomy education is cadaver [20]. However, technological developments in recent years have brought a lot of innovation, especially in the field of three-dimensional anatomy. Thanks to three-dimensional software, the most extreme points or cross-sectional anatomy that could not be dissected in the cadaver were able to be examined very well. This situation made it necessary for cadavers and technology to interact with each other [13, 21, 22].

Table 1. Percentage of frequency (f) that first-year students gave to the questions

First Year students of the medicine faculty n:75	Totally Agree (%)	Agree (%)	Undecided (%)	Totally Disagree (%)	Disagree (%)
1-"The only element that should remain unchanged from the past to the present and the future in anatomy education is the cadaver."	62,7	18,7	10,7	1,3	6,7
2-'Three-dimensional software tools describing digital subjects used in anatomy education today are effective in learning the lessons'	44	45,3	5,3	2,7	2,7
3-'Education can be done without cadavers with digital software containing transparent cadaver images that replace cadavers in the future'	12	22,7	18,7	21,3	25,3
4-'Anatomy education should be explained through fully digital three-dimensional software programs today and in the future'	9,3	9,3	14,7	34,7	32
5-'Digital three-dimensional software can even reflect depth perception perceived by touch learning (even without touching)'	0	18,7	21,3	33,3	26,7
6-'In anatomy education, cadaver can be replaced by digital three-dimensional software'	5,3	20	13,3	33,3	28
7-'Cadaver is viewed with the eyes of the first patient in medical education. The first patient can also be provided with digital three-dimensional software. A digital cadaver can replace a real cadaver. '	6,7	20	12	29,3	32
8-'In the past, by touching the cadaver and based on cadaver dissection, anatomy education can create a virtual three-dimensional dissection environment on the digital cadaver today and in the future. This is a very scientific education that does not match the old education. '	8	17,3	25,3	21,3	28
9-'The foundation of anatomy education was dissection in the past and it should be today. Cadavers are essential for education.'	56	26,7	12	1,3	4
10-'In anatomy education, mock-up and digital images are extremely sufficient in providing perception of reality. In the future, lessons should be taught on these two materials.'	6,7	14,7	30,7	17,3	30,7
11-'Variational situations that occur in cadavers can also be created with digital three-dimensional software programs. Thus, there will be no need for cadavers in the future.'	9,3	20	14,7	30,7	25,3
12-'Even if there is no perception of reality in anatomy education, anatomy will be learned with digital three-dimensional software or models, and in the future, a real patient will be touched and the perception of reality will be understood.'	4	17,3	9,3	33,3	36

Table 2. Percentage of frequency (f) that second year students gave to the questions

Second year students of the medicine faculty n:80	Totally Agree (%)	Agree (%)	Undecided (%)	Totally Disagree (%)	Disagree (%)
1-"The only element that should remain unchanged from the past to the present and the future in anatomy education is the cadaver."	38,8	30	26,3	2,5	2,5
2-'Three-dimensional software tools describing digital subjects used in anatomy education today are effective in learning the lessons'	33,8	53,7	8,8		3,7
3-'Education can be done without cadavers with digital software containing transparent cadaver images that replace cadavers in the future'	10	16,2	16,3	13,8	43,8
4-'Anatomy education should be explained through fully digital three-dimensional software programs today and in the future'	3,8	10	27,5	20	38,7
5-'Digital three-dimensional software can even reflect depth perception perceived by touch learning (even without touching)'	6,3	23,7	16,3	17,5	36,3
6-'In anatomy education, cadaver can be replaced by digital three-dimensional software'	3,8	23,8	20	21,3	31,3
7-'Cadaver is viewed with the eyes of the first patient in medical education. The first patient can also be provided with digital three-dimensional software. A digital cadaver can replace a real cadaver. '	5	15	15	20	45
8-'In the past, by touching the cadaver and based on cadaver dissection, anatomy education can create a virtual three-dimensional dissection environment on the digital cadaver today and in the future. This is a very scientific education that does not match the old education. '	5	21,3	40	8,8	25
9-'The foundation of anatomy education was dissection in the past and it should be today. Cadavers are essential for education.'	32,5	40	13,8	2,5	11,3
10-'In anatomy education, mock-up and digital images are extremely sufficient in providing perception of reality. In the future, lessons should be taught on these two materials.'	2,5	26,3	26,3	13,8	31,3
11-'Variational situations that occur in cadavers can also be created with digital three-dimensional software programs. Thus, there will be no need for cadavers in the future.'	2,5	26,3	26,3	11,3	33,8
12-'Even if there is no perception of reality in anatomy education, anatomy will be learned with digital three-dimensional software or models, and in the future, a real patient will be touched and the perception of reality will be understood.'	2,5	15	21,2	23,8	37,5

Table 3. 'p' values of first and second year students' answers to each question with chi-square test

Questions	p
1-"The only element that should remain unchanged from the past to the present and the future in anatomy education is the cadaver."	0.010
2-'Three-dimensional software tools describing digital subjects used in anatomy education today are effective in learning the lessons'	0.341
3-'Education can be done without cadavers with digital software containing transparent cadaver images that replace cadavers in the future'	0.189
4-'Anatomy education should be explained through fully digital three-dimensional software programs today and in the future'	0.076
5-'Digital three-dimensional software can even reflect depth perception perceived by touch learning (even without touching)'	0.030
6-'In anatomy education, cadaver can be replaced by digital three-dimensional software'	0.446
7-'Cadaver is viewed with the eyes of the first patient in medical education. The first patient can also be provided with digital three-dimensional software. A digital cadaver can replace a real cadaver. '	0.398
8-'In the past, by touching the cadaver and based on cadaver dissection, anatomy education can create a virtual three-dimensional dissection environment on the digital cadaver today and in the future. This is a very scientific education that does not match the old education. '	0.106
9-'The foundation of anatomy education was dissection in the past and it should be today. Cadavers are essential for education.'	0.042
10-'In anatomy education, mock-up and digital images are extremely sufficient in providing perception of reality. In the future, lessons should be taught on these two materials.'	0.331
11-'Variational situations that occur in cadavers can also be created with digital three-dimensional software programs. Thus, there will be no need for cadavers in the future.'	0.006
12-'Even if there is no perception of reality in anatomy education, anatomy will be learned with digital three-dimensional software or models, and in the future, a real patient will be touched and the perception of reality will be understood.'	0.265

p: Chi-square test of 1st and 2nd grade students 'p' values

In this study, how the future of anatomy education should be was presented to students' opinions. Both first and second-year students highly agree with the view that cadavers should be the only element that should remain unchanged from past to present and future in anatomy education. Both first and second graders adopt the view that three-dimensional software tools that describe digital subjects used in anatomy education are effective in learning lessons. Although both first and second graders strongly disagree with the sentence 'With digital software containing transparent cadaver images that replace cadavers in the future', both first and second graders are undecided and there are also those who agree with this view. However both first year and second-year students do not favor the subject of teaching anatomy education today and in the future through completely digital three-dimensional software programs.

It demonstrated a fairly high non-adoption of digital anatomy without the first class sense of touch. Although there is a high rate of participation in this situation in the second year, the indecisive attitude is also quite high in this class. When we move on to this question, which is asked for the finalization of the views such as 'cadaver in anatomy education can leave its place to three-dimensional digital software', there is a high rate of disagreement with the opinion in both the first and second grade, but there is also a low rate of agreement. From here, it can be said that there is a student population that wants a completely digital world and ignores sensory learning.

In both first and second grades, almost very few agree with the view that 'Cadaver is viewed with the eyes of the first patient in medical education. The first patient can also be provided with three-dimensional digital software. A digital cadaver can replace a real cadaver '. In this question, sensory perception is wanted to be further reinforced. The students are presented with a slightly different version of the 6th question. Thus, the desired perception situation was achieved, and the high rate of rejection of the students achieved the desired perceptual goal.

One of the most contradictory questions asked to students is that 'In anatomy education, which is based on cadaver dissection and touching the cadaver in the past, a virtual dissection environment can be created in three dimensions on the digital cadaver today and in the future. This is a very scientific education that does not match the old education. 'is the opinion. Those who do not agree with this interpretation and the first graders and undecided are almost proportionally close to each other. In the second grade, the indecisive attitude is quite high. After all, the concept of virtual cadaver may have come to students as an interesting and intriguing object.

'The foundation of anatomy education was dissection in the past and should be today. Cadavers are essential for education.' Participation to the opinion is quite high both in the first and second grades. As fantastic as digital education may seem, cadaver education still maintains its mystery and appeal. 'Variational situations that occur in cadavers can also be

created with digital three-dimensional software programs. Thus, there will be no need for cadavers in the future. 'Both first and second-grade students highly disagree with the opinion. Besides, the opinion that touching a cadaver that can be created with three-dimensional software can be equivalent to the perception of reality is quite low.

As a result, the foundation of anatomy education was dissection in the past and today, students have demonstrated a high rate of acceptance of the view that cadavers should be essential for education. Digital three-dimensional software is interesting and very positive about the fantasy world. In addition, it has a wide range of uses in some difficult areas and cross-sectional anatomy. Therefore, three-dimensional digital software can be useful tools to support anatomy education. The integration of cadaveric education with digital tools can be a very useful and up-to-date education model for both students and teachers. Based on the data of the study, it is predicted that the education model that students actually want can be like this.

CONCLUSION

In this study, support was obtained from student views about the future state of anatomy education. In this direction, it is aimed to investigate the form of anatomy education that can be the most effective and efficient for students. Cadaver is essential for anatomy education, but as long as it is integrated into technological innovations. Neither cadaver education nor digital technology education alone is enough. It must be integrated with each other.

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